

Internet Service in Minneapolis

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Dataset used

Internet Service Offers

- Sets of csv files for different providers across the US
 - Earthlink
 - Centurylink
 - Verizon
 - AT&T
 - AT&T Other

Datapoints

- Address
- Major City
- Latitude
- Longitude
- Block Group
 - Redlining Grade
 - Income Levels
 - Non-white Race Percentage
- Internet speeds
- Internet prices
- Block Income

Tools used

- Python
 - Pandas
 - Sqlite3
 - SQLAlchemy
 - Flask
 - Datetime
- DB Browser for SQLite
- JavaScript
 - Leaflet
 - Plotly
 - D3
 - ApexCharts
- CSS
- HTML

Data Wrangling

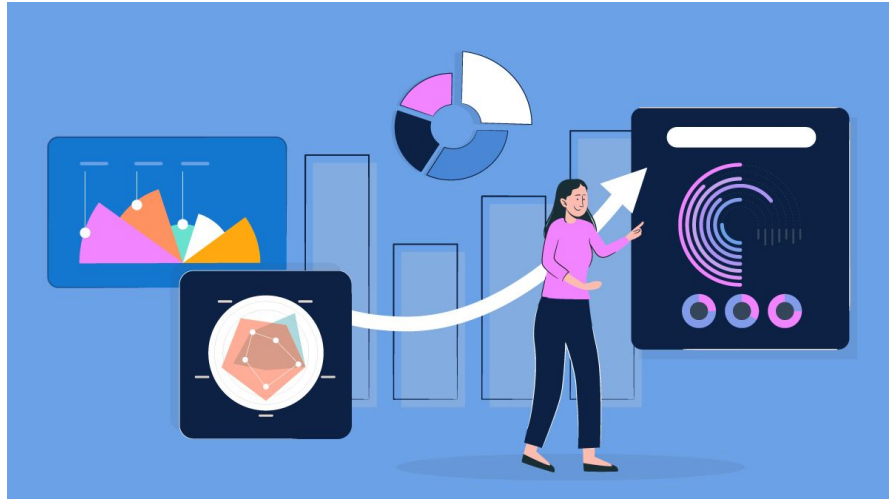
- Narrowed down search from the whole USA to just Minneapolis
- Loaded CSV's into Pandas DataFrames to create, sort, and clean data for SQLite tables
- Loaded data into a SQLite db with two classes
 - Raw Data
 - Grouped Data
- Used DB Browser for SQLite to troubleshoot database class issues
- Created the API with SQLAlchemy and Flask to return each Jsonified class on separate paths

JSON Data

```
{
  "address_full": "3739 SNELLING AVE,MINNEAPOLIS,MN 55406,USA",
  "block_group": 270531088001,
  "collection_datetime": "Sun, 17 Apr 2022 03:08:27 GMT",
  "fastest_speed_down": 940.0,
  "fastest_speed_price": 65.0,
  "income_dollars_below_median": 5651.0,
  "income_level": "Middle-Lower",
  "internet_perc_broadband": 0.6080246913580247,
  "lat": 44.9348799,
  "lon": -93.2257266,
  "major_city": "minneapolis",
  "median_household_income": 60417.0,
  "n_providers": 3,
  "package": "HSI Upto 200 Mbps/200 Mbps Prepaid",
  "ppl_per_sq_mile": 3329.255969792054,
  "price": 50.0,
  "provider": "CenturyLink",
  "race_perc_non_white": 0.6405750798722045,
  "race_quantile": "least white",
  "redlining_grade": "D",
  "speed_down": 200.0,
  "speed_down_bins": "Blazing (\u2265200)",
  "speed_unit": "Mbps",
  "speed_up": 200.0,
  "state": "MN",
  "technology": "Fiber"
},
```

```
{
  "block_group": 270531088001,
  "fastest_speed_down": 940.0,
  "fastest_speed_price": 65.0,
  "income_level": "Middle-Lower",
  "internet_perc_broadband": 0.6080246913580247,
  "latstring": [
    "44.9348799",
    "44.9346924",
    "44.9364954",
    "44.9370012",
    "44.9343974",
    "44.9344963",
    "44.9345956",
    "44.9348085"
  ],
  "lonstring": [
    "-93.2257266",
    "-93.2265906",
    "-93.2269033",
    "-93.2265476",
    "-93.2263754",
    "-93.2264468",
    "-93.2265205",
    "-93.2249469"
  ],
  "median_household_income": 60417.0,
  "n_providers": 3,
  "package": "HSI Upto 200 Mbps/200 Mbps Prepaid",
  "price": 50.0,
  "redlining_grade": "D",
  "speed_down": 200.0,
  "speed_down_bins": "Blazing (\u2265200)",
  "speed_unit": "Mbps",
  "speed_up": 200.0,
  "technology": "Fiber"
},
```

Analysis and Visualizations



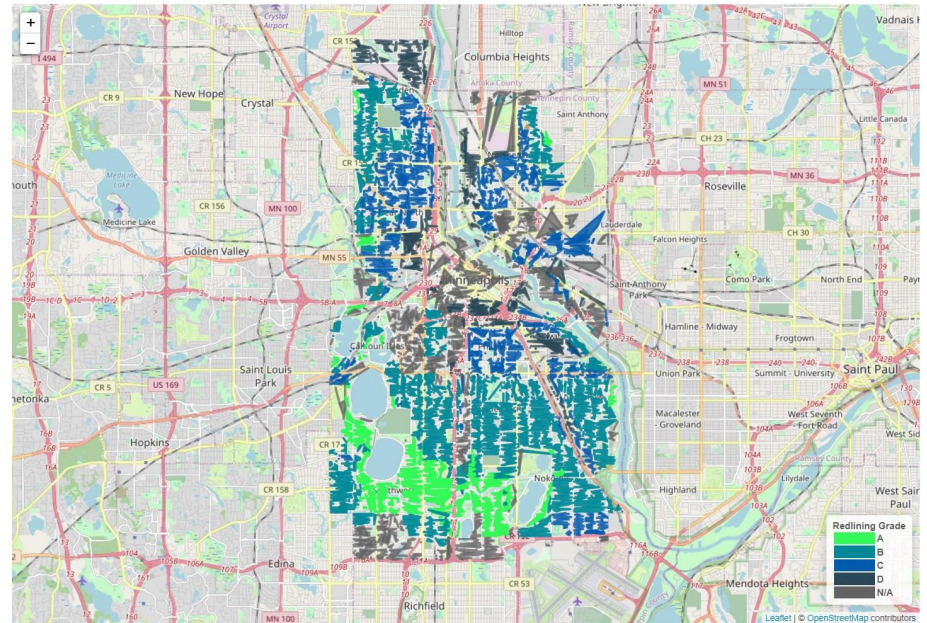
Data Visualizations

- Dan created Geomap of Minneapolis blocks showing their redlining grade
- Colleen create 3 different bar graphs measuring internet speed when it comes to income level, download speed, and race quantile
- Colleen created pie charts using ApexCharts to show the distribution of income levels for homes with Fiber available

Conclusions & Implications

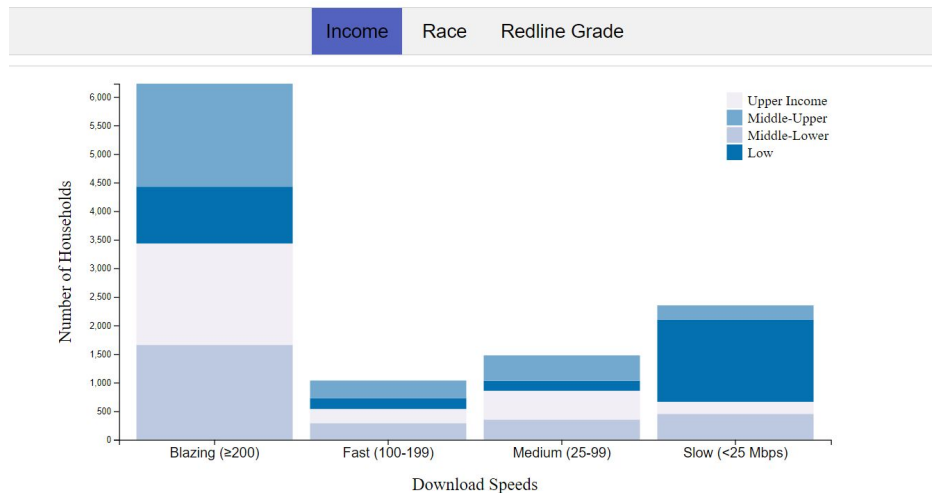
- Redlining in Minneapolis does fairly accurately reflect the parts of the city that are considered “affluent”
- “A” grades tend to be mostly higher-income whereas “B” and “C” have a wider range of income

Map of Minneapolis and Redlining Grades



Conclusions & Implications

Download Speed by Demographics of Census block group

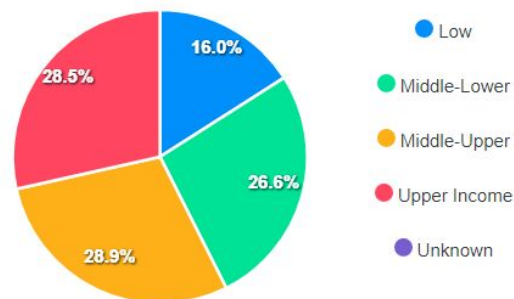


- Upper-income more white homes are highly represented in the Blazing category
- Lower-income least-white homes are highly presented in the Slow category

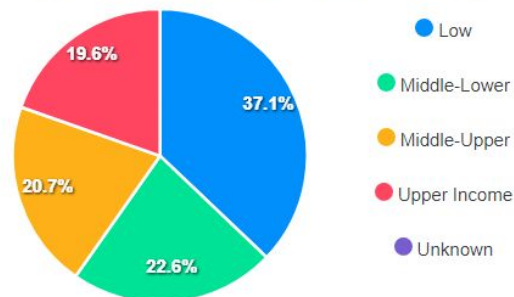
Conclusions & Implications

- The same can be shown in fiber-technology investment where higher-income homes tend to have fiber available

Income Levels for Fiber Technology



Income Levels for Non-Fiber Technology



Data Sources

Data Sources:

- META DATA FOUND IN THIS LINK From Kaggle
https://www.kaggle.com/datasets/michaelbryantds/internet-speeds-and-prices?select=speed_price_centurylink.csv
- Git Hub - <https://github.com/the-markup/investigation-isp>
- Article - <https://themarkup.org/show-your-work/2022/10/19/how-we-uncovered-disparities-in-internet-deals>